Scientific Areas of Integrated Review Groups (IRGs)

For a listing of the Scientific Review Officer and membership roster for each study section, click on the study section roster under the study section name within an IRG listed below or go to the study section index (study sections listed alphabetically) and click on the specified roster next to the name of the study section.

Biological Chemistry and Macromolecular Biophysics IRG [BCMB]

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- Biochemistry and Biophysics of Membranes Study Section [BBM]
- Enabling Bioanalytical and Biophysical Technologies Study Section [EBT]
- Macromolecular Structure and Function A Study Section [MSFA]
- Macromolecular Structure and Function B Study Section [MSFB]
- Macromolecular Structure and Function C Study Section [MSFC]
- Macromolecular Structure and Function D Study Section [MSFD]
- Macromolecular Structure and Function E Study Section [MSFE]
- Synthetic and Biological Chemistry A Study Section [SBCA]
- Synthetic and Biological Chemistry B Study Section [SBCB]
- Chemical and Bioanalytical Sciences Fellowship Special Emphasis Panel [F04A]
- Biophysical and Biochemical Sciences Fellowship Special Emphasis Panel [F04B]

Biochemistry and Biophysics of Membranes Study Section [BBM]

[BBM Membership Roster] [BBM Meeting Rosters]

The Biochemistry and Biophysics of Membranes [BBM] Study Section reviews research applications concerned with all biochemical and biophysical aspects of membrane structure and function, and with their constituent protein and lipid components. Emphasis is on the molecular details of processes that occur on or within membranes. Areas include use of biochemical and biophysical techniques to understand the structure and function of membranes and membrane-proteins. Specific areas covered by BBM:

- Membrane architecture: lipid-protein interactions, membrane protein folding, assembly, structure, and dynamics.
- Methods for membrane protein structure determination, including crystallization, solid state NMR and cryo-electron microscopy.
- Biophysics of membrane fusion mechanisms, of membrane interfaces, and signaling
- Enzyme mechanisms within membranes and interfaces: membrane-based energy transduction, membrane-bound enzymes, function of transporters, channels, receptors, glycoproteins, lipid metabolism and lipid function.
- Computational and modeling approaches to membranes and membrane proteins.

Study sections with most closely related areas of similar science listed in rank order are:

Macromolecular Structure and Function B [MSFB]
Macromolecular Structure and Function C [MSFC]
Macromolecular Structure and Function D [MSFD]
Membrane Biology and Protein Processing [MBPP]
Enabling Bioanalytical and Biophysical Technologies [EBT]
Biophysics of Neural Systems [BPNS]

TOP

Enabling Bioanalytical and Biophysical Technologies Study Section [EBT]

[EBT Membership Roster] [EBT Meeting Rosters]

The Enabling Bioanalytical and Biophysical Technologies [EBT] Study Section reviews both hypothesis and non-hypothesis driven applications focused on the development of new bioanalytical and biophysical tools, emerging techniques, and instrumentation. Emphasis is on research that probes the molecular aspects of biological systems using novel technologies or existing techniques that have been enhanced by improving the resolution, sensitivity, throughput, and fundamental underpinnings of these techniques. Specific areas covered by EBT:

- Bioanalytical techniques such as sensors, separations, mass spectrometry, molecular spectroscopy, electrochemistry arrays, microfluidics and lab-on-a-chip, and novel assays.
- Biophysical techniques such as magnetic resonance, optical and electron microscopy
- Synthesis of novel materials, labels and reagents and surface chemistries developed for use in bioanalytical or biophysical methods, including nanotechnology.
- The feasibility of recently introduced technologies to examine and explore biological systems (for example, proteomics, genomics, metabolomics, sequencing, screening, characterizing macromolecular interactions, or clinical applications) both in vivo and in vitro.
- Software development and (bio) informatics/chemometrics applied to bioanalytical instrumentation, instrumentation control, and interpretation of experimental data.

Study sections with most closely related areas of similar science listed in rank order are:

Instrumentation and Systems Development [ISD]
Microscopic Imaging Study Section [MI]
Biomaterials and Biointerfaces [BMBI]
Biochemistry and Biophysics of Membranes [BBM]
Synthetic and Biological Chemistry A [SBCA]
Synthetic and Biological Chemistry B [SBCB]

TOP

Macromolecular Structure and Function A Study Section [MSFA]

[MSFA Membership Roster] [MSFA Meeting Rosters]

The Macromolecular Structure and Function A [MSFA] Study Section reviews applications that focus on the biochemistry and biophysics of metal center containing proteins and complexes as well as the regulation of metal ion concentration in cells. A broad range of physical, chemical, genetic, kinetic, mechanistic, thermodynamic and theoretical approaches are included for studying the properties, reactivity, and interaction of a metal center with the host molecule as well as its assembly into the complex and the regulation of concentration of a metal in vivo. Specific areas covered by MSFA:

- Metalloenzymes and their mechanisms: biochemical, spectroscopic, genetic, kinetic and structural methods applied to understand the mechanism of the metal center.
- Synthetic and theoretical models of metallo-active sites: small molecule complexes and designed peptides intended to mimic an enzyme active site reactivity or metal center specificity.
- Chemistry of metal centers and organic redox active cofactors: redox chemistry of oxygen/nitrogen species. Chemistry of reactive oxygen/nitrogen metabolism: methods of generation and mitigation as well as it undesired side reactions.
- Biogenesis of complex centers: mechanism of assembly of complex metal clusters as well as their incorporation into their host proteins. Biosynthesis of organic redox active cofactors.
- Metal ion homeostasis and metabolism: regulation of influx, efflux and transport of iron, copper, zinc and manganese as well as other metals ions whose concentration must be closely controlled or limited. Mechanisms of metal ion toxicity.

Study sections with most closely related areas of similar science listed in rank order are:

Macromolecular Structure and Function B [MSFB]
Macromolecular Structure and Function D [MSFD]
Macromolecular Structure and Function E [MSFE]
Synthetic and Biological Chemistry A [SBCA]
Synthetic and Biological Chemistry B [SBCB]

TOP

Macromolecular Structure and Function B Study Section [MSFB]

[MSFB Membership Roster] [MSFB Meeting Rosters]

The Macromolecular Structure and Function B [MSFB] study section reviews applications that address basic structure-function relationships in a variety of systems, using biophysical and biochemical approaches, both experimental (e.g., X-ray crystallography, NMR, fluorescence spectroscopy) and computational modeling (e.g., molecular dynamics simulations). The emphasis is on elucidating structural and dynamical characteristics of individual proteins and nucleic acids, and their complexes, and how those properties affect function of the molecules. Specific areas covered by MSFB:

- RNA structure and dynamics; RNA-protein interactions, RNA catalysis, folding and splicing and ribozyme-based therapeutics.
- DNA structures, including of those of chemically modified DNAs, structural aspects of DNA replication and repair processes, aspects of protein-DNA systems, such as the effects of protein folding on histone-DNA interactions.
- Properties of proteins: structural dynamics of proteins, folding and misfolding processes; engineering proteins to enhance function, computer-aided drug design, allostery and cooperativity in enzyme mechanism and control, chaperones, thermodynamic and electrostatic features of protein function.
- Signal transduction in select systems, such as circadian rhythm proteins, and chemokines and their receptors.
- Enzymology of protein glycosylation and the consequences thereof, structural aspects of ubiquitination and subsequent degradation of proteins in cells.

Study sections with most closely related areas of science listed in rank order are:

Macromolecular Structure and Function C [MSFC]
Macromolecular Structure and Function D [MSFD]
Molecular Genetics A [MGA]
Molecular Genetics B [MGB]
Molecular Genetics C [MGC]
Molecular and Integrative Signal Transduction [MIST]
Intercellular Interactions [ICI]

TOP

Macromolecular Structure and Function C Study Section [MSFC]

[MSFC Membership Roster] [MSFC Meeting Rosters]

The Macromolecular Structure and Function C [MSFC] Study Section reviews applications concerned with the structural biology of proteins and nucleic acids in macromolecular assemblies, involving a broad range of biochemical and biophysical approaches to elucidate molecular interactions. Emphasis is on the application of atomic- and molecular-level information to understand biological function. Specific areas covered by MSFC:

- Protein-protein and protein-nucleic acid interactions, small molecule interactions with proteins and nucleic acids, and mechanisms of allostery.
- Protein interaction networks and signal transduction.
- Molecular motors, macromolecular machines, and systems driven by energy-dependent conformational changes including ATPases.
- Biophysical studies of muscle structure and function.
- Single molecule investigations.

Study sections with most closely related areas of similar science listed in rank order are:

Macromolecular Structure and Function B [MSFB]
Macromolecular Structure and Function D [MSFD]
Macromolecular Structure and Function E [MSFE]
Virology A [VIRA]
Molecular Genetics A [MGA]

TOP

Macromolecular Structure and Function D Study Section [MSFD]

[MSFD Membership Roster] [MSFD Meeting Rosters]

The Molecular Structure and Function Study Section D [MSFD] reviews applications that propose the development of new techniques in computational molecular modeling and simulation; theoretical mathematical and physico-chemical analysis; and bioinformatics assessment of the structure, dynamics and function of biological macromolecules as isolated entities, in multi-component complexes or in association with ligand molecules. Applications that draw heavily upon vigorous application of established computational techniques are also reviewed in MSFD. Many applications involve the close interplay of theory/modeling with predictive analysis of experimental data derived from methods such as x-ray crystallography, cryo-electron microscopy, and nuclear magnetic resonance or other spectroscopies with the preponderant effort placed on the computational/theoretical analysis. Emphasis is on the study of non-membrane associated soluble proteins, nucleic acids, and carbohydrate systems. Specific areas covered by MSFD:

- Molecular modeling and refinement of 3-D structures of macromolecules; de novo design of proteins; prediction and modeling of protein-ligand interactions and development of docking protocols; biophysical theory of macromolecular structure, function and dynamics; and prediction of macromolecular interactions at varying spatial resolutions and timescales.
- Computational methods of ligand screening in drug development and protein-protein docking.
- Development of methodologies for assessing sequence-structure-function relationships and formulating prediction of macromolecular function.
- Development of computational protocols for molecular visualization, annotation, and geometric and topological characterization of proteins and polynucleotide□s.
- Design and application of classical, quantum and QM/MM simulation methods to macromolecular systems, including validation via experimental comparison.

Study sections with the most closely related areas of similar science, listed in rank order are:

Macromolecular Structure and Function A [MSFA]
Macromolecular Structure and Function B [MSFB]
Macromolecular Structure and Function C [MSFC]
Macromolecular Structure and Function E [MSFE]
Modeling and Analysis of Biological Systems [MABS]
Biochemistry and Biophysics of Membranes [BBM]
Biodata Management and Analysis [BDMA]

TOP

Macromolecular Structure and Function E Study Section [MSFE]

[MSFE Membership Roster] [MSFE Meeting Rosters]

The Macromolecular Structure and Function E Study Section (MSFE) review applications that focus on the structure and structure-function relationships of enzymes and their complexes. Experimental approaches include the development and application of physical and chemical methods to study interactions between enzymes and their effectors and substrates. Applications evaluated in this study section cover a broad range of theoretical, computational and experimental methods that include but not limited to quantum mechanics, molecular mechanics, kinetic, mechanistic, and thermodynamic characterization of enzymes and their functions. The most commonly used experimental methods are NMR, X-Ray, laser spectroscopy and electron microscopy. The emphasis is on elucidating structure-function relationships of enzymes in their native biological systems. Specific areas covered by MSFE:

- Mechanistic enzymology involving protein and nucleic acid catalysts.
- Protein-ligand interactions and dynamics.
- Inhibitors of enzymes and their mechanisms, drug chemistry and metabolizing enzymes, biochemical mechanism based drug development.
- Macromolecular studies of metabolic pathways and networks.
- Computational and theoretical studies of biochemical reactions, application of quantum mechanics and molecular mechanics to studies of enzyme mechanisms, genomic enzymology, sequence-structure analysis to uncover mechanistic strategies of superfamilies.

Study sections with most closely related areas of science listed in rank order are:

Macromolecular Structure and Function A [MSFA]
Macromolecular Structure and Function B [MSFB]
Macromolecular Structure and Function C [MSFC]
Macromolecular Structure and Function D [MSFD]
Synthetic and Biological Chemistry A [SBCA]
Synthetic and Biological Chemistry B [SBCB]
Biochemistry and Biophysics of Membranes [BBM]

TOP

Synthetic and Biological Chemistry A Study Section [SBCA]

[SBCA Membership Roster] [SBCA Meeting Rosters]

The Synthetic and Biological Chemistry B [SBCA] study section reviews applications in the areas of chemical synthesis and chemical biology research that may contribute to advances in biology and medicine, either at a fundamental or applied level. Areas reviewed by SBCA include synthetic methodology development, nucleic acid chemistry, carbohydrate chemistry, supramolecular chemistry and the chemistry of metals, as well as the design and discovery of small molecules with potential biological or pharmaceutical activity. Specific areas covered by SBCA:

- Synthetic methodology and target oriented synthesis: Discovery and development of synthetic strategies, methodologies, reactions, reagents, and catalysts for use in chemical synthesis. This includes the synthesis of complex natural products and biologically-relevant, small molecule targets of defined structure.
- Chemical biology: Design and synthesis of bioactive small molecules to probe biological systems, including enzyme inhibitors.
- Nucleic acid chemistry: Studies directed toward understanding the chemical principles for the sequence specific recognition and modulation of DNA and RNA, including biomimetic approaches for regulation of gene expression.
- Carbohydrate chemistry: The synthesis of sugars and oligosaccharides for studying biological processes such as disease states, vaccines, and cell recognition phenomena.
- Supramolecular Chemistry: The study of molecular recognition and host-guest interactions, the synthesis of polymers and molecular assemblies for use in biological systems and medicine.
- Metals in chemistry and biology: Using synthetic chemistry and coordination chemistry to develop metallo reagents to decipher problems in biological systems.

Study sections with the most closely related areas of similar science in rank order are:

Synthetic and Biological Chemistry B [SBCB]
Macromolecular Structure and Function E [MSFE]
Neural Drug Discovery Special Emphasis Panel
Drug Discovery and Mechanisms of Antimicrobial Resistance [DDR]
Genes and Drug Delivery Systems [GDD]

TOP

Synthetic and Biological Chemistry B Study Section [SBCB]

[SBCB Membership Roster] [SBCB Meeting Rosters]

The Synthetic and Biological Chemistry B [SBCB] study section reviews applications in the areas of chemical synthesis and chemical biology research that may contribute to advances in biology and medicine, either at a fundamental or applied level. Areas reviewed by SBCB include synthetic methodology development, natural product synthesis and biosynthesis, peptide and protein chemistry, as well as the design and discovery of small molecules with potential biological or pharmaceutical activity. Specific areas covered by SBCB:

- Synthetic methodology and target-oriented synthesis: Discovery and development of synthetic strategies, methodologies, reactions, reagents, and catalysts for use in chemical synthesis. This includes the synthesis of complex natural products and biologically-relevant, small molecule targets of defined structure.
- Chemical biology: Design and synthesis of bioactive small molecules to probe biological systems, including enzyme inhibitors and other protein ligands.
- Peptide and protein chemistry: Chemical synthesis or engineering of natural and unnatural peptides/proteins. Designed systems in which chemical manipulation of protein structure is used to interrogate functional biological interactions.
- Natural product biosynthesis and discovery: Elucidation and engineering of biosynthetic pathways by which natural products are constructed in host organisms, including the biosynthesis of unnatural small molecules via genetic manipulation. Isolation and characterization of bioactive chemical compounds from natural sources.

Study sections with most closely related area of similar science listed in rank order are:

Synthetic and Biological Chemistry A [SBCA]
Macromolecular Structure and Function E [MSFE]
Drug Discovery and Molecular Pharmacology [DMP]
Drug Discovery and Mechanisms of Antimicrobial Resistance [DDR]
Neural Drug Discovery Special Emphasis Panel

TOP

Chemical and Bioanalytical Sciences Fellowship Special Emphasis Panel [F04A]

Chemical and Bioanalytical Sciences

[Biological Chemistry and Macromolecular Biophysics (BCMB) Integrated Review Group]]

[F04A Roster]

F04A reviews fellowship applications covering the chemistry of biologically and medicinally important molecules. This includes the synthesis, isolation and structural determination of small molecules as well as the chemistry of drug discovery and biological processes; structure-function relationships of enzymes and metalloproteins by kinetic and substrate analog studies; characterization of the chemistry of biologically relevant macromolecules including biopolymers and biomaterials; and development of analytical instrumentation and biosensors. Examples of specific areas covered are listed below.

- Chemical synthesis of therapeutic, pharmacological, biological, or biochemical compounds
- Development and optimization of synthetic reactions, including analysis of reaction mechanisms and kinetics
- Biosynthetic or biomimetic synthesis of natural products, including design of enzyme substrates or inhibitors
- Isolation, structural determination, and chemical synthesis of complex natural products
- Enzyme mechanism studies, including mutagenesis, analyses of transient and transition states, and steady state kinetics
- Bioinorganic chemistry, including synthesis and properties of coordination compounds and their thermodynamics, kinetics and structures
- Function and mechanism of metalloproteins, including their spectroscopic characterization
- Analytical and clinical chemistry, including fabrication methods for biomaterials and biosensor development and development of mass spectrometry, capillary electrophoresis, microfluidics, lab-on-a-chip, and other microfabicated devices
- RNA enzymology, including catalytic RNA and ribozymes

Shared Interests:

With F04B (Biophysical and Biochemical Sciences): Fellowship applications concerned with structure determination by X-ray crystallographic or NMR spectroscopic methods may be assigned to F04B; fellowship applications concerned with analysis of mechanism by inhibitor or kinetics studies related to the characterization of structure-function relationships of enzymes may be assigned to F04A.

With F05 (Cell Biology and Development) : Fellowship applications concerned with the effects on cellular function or enzyme mechanism and interaction may be assigned to F05; fellowship applications that are concerned with the mechanism of an enzyme or a system of enzymes may be assigned to F04A.

With F09 (Oncological Sciences): Fellowship applications that focus on the efficacy and safety of anticancer compounds or the properties of cancer specific proteins, lipids, and related compounds may be assigned to F09; fellowship applications that focus on developing and synthesizing new and different compounds or with the physical chemistry and structure of proteins, lipids, and other biopolymers may be assigned to F04A or B.

With F13 (Infectious Diseases and Microbiology): Fellowship applications that focus on structure-activity relationships in antimicrobial therapeutic agents may be assigned to either F13 or F04A; fellowship applications concerned with chemical syntheses of antimicrobial therapeutic agents may be assigned to F04A

With F14 (Technology Development): Fellowship applications that are concerned primarily with the development of new methods, instrumentation, or technology for use in studies of biologically and medicinally important molecules may be assigned to F14; fellowship applications that are concerned primarily with elucidating the chemical principles of biologically and medicinally important molecules may be assigned to F04A.

With F15 (Bioengineering and Imaging): Fellowship applications addressing the development of diagnostic agents for imaging may be assigned to F15. Fellowship applications that address the synthesis, isolation and structural determination of small molecules for drug delivery, structure-function relationships of enzymes and metalloproteins, characterization of biologically relevant macromolecules including biopolymers and biomaterials, or the development of analytical instrumentation or biosensors may be assigned to F04A.

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Biophysical and Biochemical Sciences Fellowship Special Emphasis Panel [F04B]

Biophysical and Biochemical Science

[Biological Chemistry and Macromolecular Biophysics (BCMB) Integrated Review Group]

[F04B Roster]

F04B reviews fellowship applications covering structure and biophysical behavior and dynamics of biological macromolecules. This includes applications concerned with the structure-function relationships of proteins, nucleic acids, glycoproteins, lipid bilayers and membrane proteins; X-ray crystallography, multi-dimensional NMR, electron microscopy, circular dichroism, fluorescence, and computational methods; single molecule dynamics and interactions by fluorescence and microscopic techniques; and molecular interactions for defining and maintaining cellular shape and function. Examples of specific areas covered are listed below.

- Proteomics, global approaches to protein function, and posttranslational modification
- Computational data mining for analysis of proteins and related microarrays
- Physical chemistry of biological macromolecules, including conformation and structure of proteins and nucleic acids
- Spectroscopic methods, including multi-dimensional nuclear magnetic resonance, X-ray crystallography, Raman and FTIR
- Protein and nucleic acid folding and conformation by experimental and computational methods
- Thermodynamics of macromolecular interactions, including isothermal calorimetry
- Kinetic analyses, including pH or temperature jump methods
- Structure and physical chemistry of lipid bilayer membranes and related model systems
- Physical chemical instrumentation, including development of new approaches and application of computers to such instrumentation
- Indirect methods for structure and dynamics determinations, including fluorescence dye labeling and tethering
- Carbohydrate biochemistry and glycoproteins, including synthesis and processing
- Signal transduction at molecular or subcellular levels, including protein structure, function, and enzymology
- Extracellular matrix at molecular or subcellular levels
- Motility and cytoskeleton at molecular or subcellular levels

Shared Interests:

With F03A (Biochemical and Molecular Neuroscience): Fellowship applications concerned with neuronal function and structure in the areas of membrane recycling, protein structure-function and cytoskeleton structuremay be assigned to F03A; fellowship applications concerned with quantitative analysis of biomolecular interactions and defining specific folding conformations may be assigned to F04B.

With F03B (Biophysical and Physiological Neuroscience): Fellowship; fellowship applications that focus on signal transduction and related processes that occur at the single cell neuronal level with emphasis on cell electrophysiology, molecular biophysics, and neurochemical pathways may be appropriate for F03B; fellowship applications concerned with quantitative analysis of biomolecular interactions and defining specific folding conformations may be assigned to F04B.

With F04A (Chemical and Bioanalytical Sciences) : Fellowship applications concerned with analysis of mechanism by inhibitor or kinetics studies related to the characterization of structure-function relationships of enzymes may be assigned to F04A; fellowship applications concerned with structure determination by X-ray crystallographic or NMR spectroscopic methods may be assigned to F04B.

With F05 (Cell Biology and Development) regarding cellular structure and function: Fellowship applications that are concerned with structural and functional studies of cells and cell components when the emphasis is on molecular and cell biological context may be assigned to F05; fellowship applications that are concerned with the molecular interactions among molecules that affect cellular structure may be assigned to F04B.

With F08 (Genomics, Genetics, DNA Replication, and Gene Expression): Fellowship applications focused on mechanisms of DNA replication/repair and gene expression/regulation may be assigned to F08; fellowship applications focused on enzymological or structural aspects of nucleic acids and nucleic acid protein interactions may be assigned to F04B. However, a biophysical study of DNA or RNA may be assigned to F04B, not F08.

With F09 (Oncological Sciences): Fellowship applications that are concerned with the physical chemistry and structure of proteins, lipids, and other biopolymers may be assigned to F04B; fellowship applications that are concerned with studying the properties of cancer specific proteins, lipids, and related compounds may be assigned to F09.

With F13 (Infectious Diseases and Microbiology): If the focus of the study is to elucidate the role of the molecule in infection, it may be assigned to F13. If the focus of an application is on studying chemistry or physics of a macromolecule without reference to its role in infection, assignment may be to F04B.

With F14 (Technology Development): Fellowship applications that are concerned with the development of new methods, instrumentation, or technology for use in studies of biological macromolecules may be assigned to F14; fellowship applications that are concerned primarily with elucidating the structural principles, biophysical behavior, and dynamics of biological macromolecules may be assigned to F04B.

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